

OILFIELD RESEARCH LABORATORIES

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May 23, 1980

James E. Russell Petroleum, Inc.
P.O. Box 2618
Abilene, Texas 79604

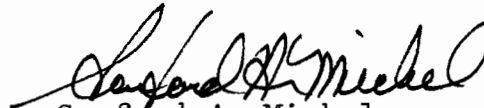
Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from the Alexander Lease, Well No. O-22, Woodson County, Kansas, and submitted to our laboratory on April 17, 1980.

Your business is greatly appreciated.

Very truly yours,

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Sanford A. Michel

SAM/tem
3 c to Abilene, Texas
2 c to Chanute, Kansas

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GENERAL INFORMATION & SUMMARY

Inc.

Company James E. Russell Petroleum, Inc. Lease Alexander Well No. 0-22

Location 990' WEL & 2310' NSL

Section 2 Twp. 24S Rge. 16E County Woodson State Kansas

Elevation, Feet Datum: Mean Sea Level (G.L.) . . . 1072.5

Name of Sand Squirrel

Top of Core 1035.0

Bottom of Core 1054.3

Top of Sand 1035.0

Bottom of Sand 1046.6

Total Feet of Permeable Sand 8.9

Total Feet of Floodable Sand 8.5

Distribution of Permeable Sand: Permeability Range Millidarcys

Feet

Cum. Ft.

0 - 50	3.0	3.0
50 - 100	3.4	6.4
100 - 150	2.5	8.9

Average Permeability Millidarcys 70.9

Average Percent Porosity 18.2

Average Percent Oil Saturation 54.3

Average Percent Water Saturation 24.9

Average Oil Content, Bbls./A. Ft. 765.

Total Oil Content, Bbls./Acre 8,568.

Average Percent Oil Recovery by Laboratory Flooding Tests 18.9

Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft. 274.

Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre 2,326.

Total Calculated Oil Recovery, Bbls./Acre See "Calculated Recovery" Section.

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The core was sampled by a representative of Oilfield Research Laboratories. Fresh water mud was used as a drilling fluid. The core was from a non-virgin area.

FORMATION CORED

The detailed log of the formation cored is as follows:

<u>Depth Interval, Feet</u>	<u>Description</u>
1035.0 - 1038.5	Sandstone, dark brown, slightly calcareous.
1038.5 - 1039.2	Sandstone and shale, brown and gray, laminated.
1039.2 - 1039.6	Shale, gray, sandy.
1039.6 - 1039.9	Sandstone, dark brown.
1039.9 - 1041.6	Sandstone and shale, brown and gray, laminated.
1041.6 - 1042.1	Sandstone, brown.
1042.1 - 1045.5	Sandstone, dark brown, slightly calcareous.
1045.5 - 1046.0	Sandstone, gray, carbonaceous.
1046.0 - 1046.6	Sandstone, grayish brown, shaly.
1046.6 - 1054.3	Shale, gray, sandy.

LABORATORY FLOODING TESTS

The upper portion of the sand in this core responded well, relative to the lower portion of the sand, to laboratory flooding tests, as a total overall recovery of 2,326 barrels of oil per acre was obtained from 8.5 feet of sand. The weighted average percent oil saturation was reduced from 57.3 to 38.4, or represents an average recovery of 18.9 percent. The weighted average effective permeability of the samples is 1.45 millidarcys,

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while the average initial fluid production pressure is 31.9 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 12 samples tested, 8 produced water and oil, and 1 sample produced water only. This indicates that approximately 67 percent of the sand represented by these samples is floodable pay sand.

CALCULATED RECOVERY

It would appear from a study of the core data, that efficient primary and waterflood operations in the vicinity of this well should recover approximately 3,050 barrels of oil per acre. This is an average recovery of 359 barrels per acre foot from 8.5 feet of floodable sand analyzed in this core.

These recovery values were calculated using the following data and assumptions:

Original formation volume factor, estimated	1.07
Reservoir water saturation, percent, estimated	10.0
Average porosity, percent	18.4
Oil saturation after flooding, percent	38.4
Performance factor, percent, estimated	55.0
Net floodable sand, feet	8.5

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PRIMARY RESERVES ESTIMATE

Average porosity (permeability 1.0 millidarcys or greater)	19.4
Net pay thickness (1035.0 - 1046.6)(Permeability 1.0 millidarcy or greater)	8.9'
Estimated primary reserves as a percent of oil in place	4.0
Estimated formation volume factor	1.07
Reservoir water saturation percent, estimated	10.0
Estimated primary reserves, barrels per acre foot	51.
Estimated primary reserves, barrels per acre	454.

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company James E. Russell Petroleum, Inc. Lease Alexander Well No. 0-22

Sample No.	Depth, Feet	Effective Porosity Percent	Percent Saturation			Oil Content Bbls. / A Ft.	Perm., Mill.	Feet of Sand		Total Oil Content	Perm. Capacity Ft. X md.
			Oil	Water	Total			Ft.	Cum. Ft.		
1	1035.8	18.7	62	12	74	900	35.	1.0	1.0	900	35.00
2	1036.6	17.9	69	12	81	958	60.	1.0	2.0	958	60.00
3	1037.7	22.4	59	10	69	1025	77.	1.5	3.5	1538	115.50
4	1038.6	16.7	27	43	70	350	14.	0.7	4.2	245	9.80
5	1039.8	23.4	60	12	72	1089	20.	0.3	4.5	327	6.00
6	1040.5	12.9	57	38	95	570	Imp.	1.7	6.2	969	0.00
7	1041.8	20.5	61	17	78	970	32.	0.5	6.7	485	16.00
8	1042.6	20.7	51	24	75	819	61.	0.9	7.6	737	54.90
9	1043.4	22.5	37	15	52	645	135.	1.0	8.6	645	135.00
10	1044.9	15.9	57	33	90	703	127.	1.5	10.1	1055	190.50
11	1045.8	16.9	59	32	91	774	17.	0.5	10.6	387	8.50
12	1046.3	15.7	44	51	95	536	Imp.	0.6	11.2	322	0.00

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company		James E. Russell Petroleum, Inc.		Lease	Alexander	Well No.	0-22
Depth Interval, Feet	Feet of Core Analyzed	Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.		
1035.0 - 1042.1	5.0	1035.0 - 1042.1	5.0	48.5	242.30		
1042.1 - 1046.6	3.9	1042.1 - 1046.6	3.9	99.7	388.90		
1035.0 - 1046.6	8.9	1035.0 - 1046.6	8.9	70.9	631.20		

Depth Interval, Feet	Feet of Core Analyzed	Average Percent Porosity	Average Percent Oil Saturation	Average Percent Water Saturation	Average Oil Content Bbl./A. Ft.	Total Oil Content Bbls./Acre
1035.0 - 1042.1	6.7	18.1	57.3	21.8	809	5,422
1042.1 - 1046.6	4.5	18.4	49.8	29.5	699	3,146
1035.0 - 1046.6	11.2	18.2	54.3	24.9	765	8,568

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Company			James E. Russell Petroleum, Inc.				Lease		Alexander		Well No.		0-22	
Sample No.	Depth, Feet	Effective Porosity Percent	Original Oil Saturation		Oil Recovery		Residual Saturation			Volume of Water Recovered cc*	Effective Permeability Millidarcys*	Initial Fluid Production Pressure Lbs./Sq./In.		
			%	Bbls./A. Ft.	%	Bbls./A. Ft.	% Oil	% Water	Bbls./A. Ft.					
1	1035.8	19.0	62	914	26	383	36	56	531	80	1.12	35		
2	1036.6	18.2	69	974	34	480	35	57	494	119	2.10	30		
3	1037.7	22.0	59	1007	27	461	32	61	546	48	0.60	25		
4	1038.6	17.0	26	343	0	0	26	45	343	0	Imp.	-		
5	1039.8	23.3	60	1085	23	416	33	64	669	327	5.85	20		
6	1040.5	13.2	57	584	16	164	41	52	420	19	0.22	40		
7	1041.8	20.4	61	965	21	332	40	49	633	12	0.15	45		
8	1042.6	20.6	51	815	0	0	51	47	815	133	2.32	30		
9	1043.4	22.8	37	654	3	53	34	53	601	143	5.52	25		
10	1044.9	16.0	57	708	8	99	49	41	609	36	0.30	35		
11	1045.8	16.5	59	755	0	0	59	34	755	0	Imp.	-		
12	1046.3	16.0	43	534	0	0	43	52	534	0	Imp.	-		

Company James E. Russell Petroleum, Inc. Lease Alexander Well No. 0-22

Notes: cc—cubic centimeter.

*—Volume of water recovered at the time of maximum oil recovery.

**—Determined by passing water through sample which still contains residual oil.

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SUMMARY OF LABORATORY FLOODING TESTS

TABLE V

Company	James E. Russell Petroleum, Inc.	Lease	Alexander	Well No.	0-22
Depth Interval, Feet	1035.0 - 1042.1	1042.1 - 1046.6	1035.0 - 1046.6		
Feet of Core Analyzed	6.0	2.5	8.5		
Average Percent Porosity	18.3	18.7	18.4		
Average Percent Original Oil Saturation	60.6	49.0	57.3		
Average Percent Oil Recovery	24.2	6.0	18.9		
Average Percent Residual Oil Saturation	36.4	43.0	38.4		
Average Percent Residual Water Saturation	56.1	45.8	53.1		
Average Percent Total Residual Fluid Saturation	92.5	88.8	91.5		
Average Original Oil Content, Bbbls./A. Ft.	867.	687.	814.		
Average Oil Recovery, Bbbls./A. Ft.	354.	81.	274.		
Average Residual Oil Content, Bbbls./A. Ft.	513.	606.	540.		
Total Original Oil Content, Bbbls./Acre	5,199.	1,717.	6,916.		
Total Oil Recovery, Bbbls./Acre	2,124.	202.	2,326.		
Total Residual Oil Content, Bbbls./Acre	3,075.	1,515.	4,590.		
Average Effective Permeability, Millidarcys	1.06	2.39	1.45		
Average Initial Fluid Production Pressure, p.s.i.	32.5	30.0	31.9		

NOTE: Only those samples which recovered oil were used in calculating the above averages.